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Measurement of gas properties in a Spherical Proportional Counter

Thursday, 28 May 2020 09:36 (18 minutes)

NEWS-G (New Experiments With Spheres-Gas) is an experiment searching for dark matter using the Spherical Proportional Counter (SPC) technique. SPCs are low capacitance detectors which allow the detection of gas ionisation with very low (single electron) thresholds. It consists in a grounded metal sphere with a small sensing anode at the center, creating a radial electric field.
Using a UV laser, we extract electrons from the sphere surface, which allows a fine calibration of gain, diffusion and drift time of electrons in the SPC. When combining this with the signal from a ^{37}Ar gaseous radioactive source, we can measure the mean ionisation W for various gas mixture. We will also show results on the effect of space charges from drifting ions on the properties of the detector. For this, we will compare in particular data taken in high background on a surface lab, and data taken in a low background detector in the underground laboratory in Modane (LSM, France).

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